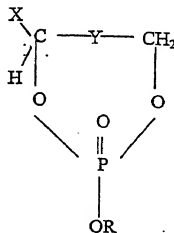


# CLAIMS:

1. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and, as an active ingredient, a compound of the general formula I:



wherein

Y is  $-(\text{CH}_2)_m-$ ,  $-\text{CH}(\text{OH})-$  or  $-\text{C}(=\text{O})-$ , and m is 0 - 3 ;

X is H, alkyl,  $-\text{CH}_2\text{OH}-$ ,  $\text{CH}_2\text{Oacyl}$  or  $-\text{CH}_2\text{acyl}$ ; and

R is H, a cation, alkyl or optionally substituted aryl.

2. A pharmaceutical composition according to Claim 1, wherein said alkyl groups have 1-24 carbon atoms, said acyl groups are aliphatic saturated or unsaturated  $\text{C}_1 - \text{C}_{24}$  acyl groups and said aryl group is a carbocyclic aryl group optionally substituted by  $\text{C}_1 - \text{C}_4$  alkyl, halogen and/or hydroxy.
3. A pharmaceutical composition according to Claim 2, wherein said acyl groups are derived from natural fatty acids.
4. A pharmaceutical composition according to Claim 3, wherein said acyl group is a saturated aliphatic acyl group selected from acetyl, butyryl, caproyl, octanoyl, decanoyl, lauroyl, myristyl, palmitoyl and stearoyl, or an unsaturated aliphatic acyl group selected from palmitoleyl, oleyl, linoleyl, and ricinoleyl.
5. A pharmaceutical composition according to any one of Claims 1-4, wherein said aryl group is phenyl.
6. A pharmaceutical composition according to Claim 1, comprising 1,2-cyclic propanediol phosphate.

7. A pharmaceutical composition according to Claim 1, comprising phenyl 1,2-cyclic propanediol phosphate.
8. A pharmaceutical composition according to Claim 1, comprising 1,2-cyclic glycerophosphate.
9. A pharmaceutical composition according to Claim 1, comprising phenyl 1,2-cyclic glycerophosphate.
10. A pharmaceutical composition according to Claim 1, comprising 3-acyl 1,2-cyclic glycerophosphate.
11. A pharmaceutical composition according to Claim 1, comprising cyclic oleyl lysophosphatidic acid.
12. A pharmaceutical composition according to Claim 1, comprising 1,3-cyclic propanediol phosphate.
13. A pharmaceutical composition according to Claim 1, comprising phenyl 1,3-cyclic propanediol phosphate.
14. A pharmaceutical composition according to Claim 1, comprising 1,3-cyclic glycerophosphate.
15. A pharmaceutical composition according to Claim 1, comprising phenyl 1,3-cyclic glycerophosphate.
16. A pharmaceutical composition according to Claim 1, comprising cyclic dihydroxyacetone phosphate.
17. A pharmaceutical composition according to Claim 1, comprising phenyl cyclic dihydroxyacetone phosphate.
18. A pharmaceutical composition for inducing phosphorylation in intracellular proteins of target cells comprising a pharmaceutically acceptable carrier and, as an active ingredient, a compound of general Formula I of Claim 1.
19. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and, as an active ingredient, a compound of the general Formula I of Claim 1 for promotion of cell differentiation in target cells.
20. A pharmaceutical composition according to Claim 19, for the treatment of malignant diseases and disorders.

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21. A pharmaceutical composition according to Claim20, wherein said malignant disorder is a blood malignancy.
22. A pharmaceutical composition according to Claim21, wherein said blood malignancy is leukemia.
- 5 23. A pharmaceutical composition according to Claim20, wherein said malignancy is breast cancer.
24. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and, as an active ingredient, a compound of the general Formula I of Claim 1, for induction of hormone-like signaling.
- 10 25. A pharmaceutical composition according to Claim24, wherein said hormone is insulin and the composition is for the treatment of non-insulin-dependent diabetes mellitus (non-IDDM type II diabetes).
26. A pharmaceutical composition according to Claim24, wherein said hormone is human growth hormone (HGH) for the treatment of disorders in
- 15 which HGH is involved.
27. A pharmaceutical composition according to Claim24, wherein said hormone is epidermal growth factor (EGF) for the treatment of disorders involving EGF.
28. A compound of the general Formula I of Claim 1, with the exception of
- 20 the following compounds:
- i. compounds wherein Y is -  $(CH_2)_m$  -, m is 0, X is  $CH_3$ ,  $-CH_2OH$  or  $CH_2Oacyl$  wherein acyl is a saturated carboxylic acyl with more than 12 carbon atoms, and R is H or a cation;
  - ii. compounds wherein Y is -  $(CH_2)_m$  -, m is 1, X is H and R is H, a cation or phenyl; and
  - 25 iii. compounds wherein Y is -  $CH(OH)$  -, X is H and R is H, a cation or phenyl.
29. A compound according to Claim 28, selected from the group consisting of:
- i. phenyl 1,2 cyclic glycerophosphate;
  - 30 ii. phenyl 1,2 cyclic propanediol phosphate;

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- iii. cyclic dihydroxyacetone phosphate;
- iv. phenyl cyclic dihydroxyacetone phosphate; and
- v. cyclic oleyl lysophosphatidic acid.

30. A method for treatment of disorders and diseases which can be treated by  
5 phosphorylation of intracellular proteins comprising administering to the individual in need a therapeutically effective amount of a compound of general Formula I of Claim 1.

31. A method for the treatment of malignant diseases comprising  
administering to an individual in need a therapeutically effective amount of the  
10 compound of Formula I of Claim 1.

32. A method according to Claim 31, wherein said malignant disease or disorder is blood malignancy.

33. A method according to Claim 32, wherein said blood malignancy is leukemia.

15 34. A method according to Claim 31, wherein said malignant disease is breast cancer.

35. A method for the treatment of diseases involving hormone-like signaling comprising administering to an individual in need a therapeutically effective amount of the compound of Formula I of Claim 1.

20 36. A method according to Claim 35, wherein said hormone is insulin and the disease treated is non-IDDM type II diabetes.

37. A method according to Claim 35, wherein said hormone is human growth hormone (HGH) and the diseases treated are disorders in which HGH is involved.

38. A method according to Claim 35, wherein said hormone is epidermal  
25 growth factor (EGF) and the diseases treated are disorders involving EGF.

39. A method for detecting abnormal conditions of a tested cell comprising:

- i. contacting the cells with cyclic glycerophosphates or their analogs (herein CGs) of formula I in Claim 1;
- ii. detecting the level of phosphorylation in intracellular proteins of  
30 the tested cells; and

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- iii. comparing said level of phosphorylation to the level of phosphorylation in intracellular proteins of normal cells following contact with said CGs, a level of phosphorylation differing from that detected in the normal cells indicating a high probability of abnormality in the tested cells.

- 5 40. Use of a compound of the general Formula I as defined in Claim 1, for preparation of a medicament for the treatment of disorders and diseases that can be treated by phosphorylation of intracellular proteins.
- 10 41. Use of a compound of the general Formula I as defined in Claim 1, for the preparation of a medicament for the treatment of malignant diseases and disorders.
42. Use of a compound of the general Formula I as defined in Claim 1, for the preparation of a medicament for the treatment of diseases or disorders involving hormone-like signaling.
- 15 43. Use of a compound according to Claim 28, in the preparation of a medicament.
44. Use of a compound according to Claim 29, in the preparation of a medicament.